Slow-CT* are fused. Around the tumor will appear its movement blurring, it is the ITV. (g) We design treatment on the Slow-CT*. (h) In the ConeBeamCT the tumor blurring must not exceed the PTV. (i) Patient is treated on Elekta-Synergy linac. (j) After every treatment we repeat the acquisition IGRT and check the modifications during the treatment.
Results. Up to date a total of 10 patients have been treated, 9 primary tumors and a local relapse: 3–5 sessions and 40–50 Gy dose range. CT/PET images show complete response in 8 patients after 6 months. There were no G3 pneumonitis and no G2 esophagus toxicity. The systematic error of intra-fraction movements were 0.4 mm, 0.5 mm and 0.9 mm (*x*,*y*,*z*) and the random error were 0.5 mm, 0.5 mm and 1 mm (*x*,*y*,*z*). Only in one patient the treatment time exceeded 12 min.
Conclusions. ExaCradel and ConeBemaCT form a precise and rapid system as SBRT technology.

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Hypothalamic hamartomas: Clinical experience in 23 cases treated with Gamma-Knife surgery

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Hypothalamic hamartomas (HH) arise as a result of an incorrect embryonic cell migration. Most patients with a HH are asymptomatic. Gelastic seizures in association with HH were described some years ago and the majority of these patients present medically refractory epilepsy. They can develop a severe epileptic encephalopathy associated to behavior and cognitive disorders and precocious puberty (related to secretory granules). Surgery can be an effective treatment but it has been related to important morbidity and mortality because of their location and relation to critical structures (optical pathways). The objective of the present study is to evaluate our results with Gamma-Knife surgery (GKS) treatment in these lesions. *Methods*. We have treated by GKS 30 patients with HH from 2002 to nowadays. We retrospectively reviewed our prospectively collected data and analyze 23 of these patients. This series includes 14 women and 9 men, presenting lesions from 8 cc to 0.2 cc. Mean age was 17 years old (ranged: 16 months to 45 years). For diagnosis and planning Video-EEG, CT and stereotactic MRI (T1, T2, Flair and T1 post-gadolinium, using axial, coronal and sagittal sections) were used.
Results. 8 cases had been operated previously. The mean coverage dose has been 18.5 Gy. More than 70% of the patients had a positive outcome, even though most of them still need medication. After 2 years follow-up, 5 cases were re-treated due to medically refractory symptom persistence or reappearance. The mean coverage dose used was 17 Gy. In 2 of these 5 patients a favorable evolution was observed.
Conclusions. In the treatment and control of medically refractory epilepsy secondary to HH we considered GKS as an effective, safe and reliable option. Prognostic factors that should be considered are evolution time (the precocity of treatment) and other epileptic focus absence. Other factors are lesion size and relation-distance between the HH and the critical structures. The possibility of achieving a correct coverage dose of more than 17 Gy irradiating the entire lesion depends of them. These facts have been confirmed in our series.

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Modelling and commissioning of a radiosurgery cone system for trigeminal neuralgia

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Objective. LINAC-based radiosurgery is commonly used for trigeminal neuralgia treatment. Due to the small size and spherical or elliptical geometry of the target, small cones are suitable for this technique.
Materials and methods. A radiosurgery cone set (Brainlab) of diameter 5, 6, 7.5 and 10 mm was modelled for a 6MV linac PRIMUS (Siemens). Reference dose was measured using a camera PTW Farmer type 30013. Output factor, PDDs and OARs were measured for each cone in a PTW water phantom MP3 using a diode detector PTW 60012. Correction in output factors is up to 6% for the cone of 5mm. For commissioning the TPS: accuracy of monitor units (MU) calculations, isocentre localization, punctual dose with MOSFET, and dose profiles with Gafchromics films.
Results. We performed several verifications: (1) Manual calculation of MU performed with measured data shows a maximum difference of 1.3%. (2) We used a Gafchromic EBT2 placed in the stereotactic localizer with a pin to locate isocentre. After a CT scan, pin delineated and used like isocentre to deliver the treatment. Isocentre localization was less than 0.5 mm. (3) We scanned an anthropomorphic Alderson Rando phantom head with a MOSFET detector placed inside. We localized the CT scan using iPLan, marked the isocentre at the MOSFET and delivered treatment. The dose agreement was for the 10-mm cone, lesser than 5% (MOSFET uncertainty: 3%). (4) A film was placed at depth of 15 mm in a water phantom and an arc of 120° was delivered. We compared measured data with TPS calculation using OmniPro® (IBA). A good agreement is showed for inplane and crossplane.

Conclusion. The most accurate and reliable method for measuring relative dose are films. Diodes and MOSFET can be used for output factor measurements, but corrections must be taken into account. Results are consistent and the first clinical results indicate a favourable evolution.

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Online verification of intrafraction motion in VMAT stereotactic prostate treatment

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Purpose. In this study we report our first clinical results of prostate motion management during stereotactic gated RapidArc treatment and a novel application, Intrafraction Motion Review (IMR, Varian medical systems) allowing kV/MV images acquisition during dose delivery.
Methods and materials. Seven prostate cancer patients were treated using the gated RapidArc technique with a Varian Novalis Truebeam linear accelerator. Before treatment simulation, three gold fiducial markers and Hialuronic Acid were implanted inside the prostate using transrectal ultrasound guidance. A computed tomography (CT) was registered with a MR acquisition for simulation. Treatment planning was realized on an Eclipse workstation with PRO 3 algorithm V 10.0.28. Dose delivery consists on 2 arcs using Rapidarc modality with 600 MU/min maximum dose rate on a Novalis Truebeam linear accelerator. An equivalent dose of 84 Gy over 20 fractions at 3.1 Gy/fraction was delivered. Before the treatment delivery, the RPM block placed on patient's abdominal surface generate the gating signal use for IMR acquisition on V1.6 of Truebeam. Then, the patient's alignment is set based on markers using daily cone beam CT (CBCT) and kV/kV matching. During the treatment, kV images were acquired at each exhale phase of the breathing cycle and the positions of the fiducial markers were compared with their expected positions represented by a green circle with a diameter corresponding to the fiducial length. We reported here for the six first patients the differences between expected and real fiducial position. The treatment delivery parameters such as number of kV images acquired per fraction, the fraction's time and the room occupation's time were also mentioned.
Results. Fraction time delivery (time to deliver the total dose) was 16 ± 6 min. The number of KV images acquired during VMAT delivery is 26 ± 15 with a maximum of 64. Average deviation in cranio caudal direction was analyzed on each images resulting in a mean deviation of 0.29 [0–1.4] mm. Antero posterior or lateral shifts are difficult to analyzed in a post processing phase as they are not visible on all KV images but online correction with a shift of fiducial outside the green circles was necessary for only 2 sessions on 120.
Conclusion. Intrafraction KV verification is possible with the IMR system available on Truebeam. Increase in time session acceptable even if the process must actually be associate to a respiratory gate treatment. New version of the software in the next future will allow this kind of online verification without the need of RPM system.

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Outcomes after SBRT with curative intent in oligorrecurrent patients

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Purpose. Determine the impact of treatment with SBRT with curative intent in the evolution of the disease in oligometastastatic patients treated in our center.
Methods. Between 2008 and 2012, 7 patients with less than 5 metastatic lesions and primary controlled were enrolled on prospective studies of SBRT for oligometastases. All available records were retrospectively reviewed to determine the evolution of the disease. The hystologies were: 1 endometrium, 1 breast cancer, 2 prostate, 2 GI ADC, 1 NSCLC. The location of oligometastasis were: 2 spine, 4 bone, 1 liver, 2 lung, 1 retroperitoneum. All patients has ECOG 0-1. The median age was 64 years, median time from diagnosis of the primary diagnosis of metastases was 4.7 years. PTV volume of the lesions was between 13 cc and 55 cc, the doses administered were 21 Gy in 3 fx to 60 Gy to in 5 fx. In all cases the technique was guided by CBKvCT image after CT simulation, fusion with PET/CT and/or MRI, and calculation, 4 with 3DRTE and 3 with IMRT. The toxicity was reported with the CTCAE.4 scale by site.
Results. With a median follow-up of 27 months (4–50), the results in terms of local control after treatment of metastases were 80% (2 local progressions and treated again with SBRT, and 1 distance progression treated with chemotherapy). All patients are alive and maintain his ECOG at the time of the study. The improvement of symptoms was 90%. The toxicity reported in all the patients was less than G2 in CTCAE.4 scale by site. No chronicle toxicity was reported.
Conclusions. Among this limited experience, SBRT is a good option in oligorecurrent patients, and perhaps may yield prolonged survival, cure or chroniphy the disease in select patients with limited metastases.

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